



Sharon Fang

09/15/2009 11:36 AM

To: "Davies, Wyn" <WDavies@PIRNIE.COM>,  
Subject: Re: Metal Bank/Final Tierod Design Memorandum 📎

Hi Wyn,

Here are our comments on the Final Tierod Design Memo:

This memo presents global stability analyses for 2 sections of the wall where the tieback spacing exceeded the spacing recommended in the original design by Hart Crowser. The memo states that is limited to global stability analyses of the wall only and explicitly states that it does not include structural checks for the individual components of the wall including the concrete deadmen, tierods, continuous walers, or other components.

1. The spacing between tiebacks has increased, which increases the tributary area and in effect the load that each tieback must support. This also increases the load on both the continuous waler and deadmen. Therefore, it is necessary to perform calculations to determine the new load magnitudes caused by the increased tieback spacings and to analyze the tiebacks, waler and deadman to determine if these structural elements can support the new increased loads. Based on the provided as-built survey, it appears that the maximum spacing between tierods is 21 feet; the analysis should be performed for the tieback load for this spacing. However, if a greater spacing between tiebacks has been observed in the field since issue of this memo, the analysis should be performed for the maximum anticipated spacing between tierods. This maximum tieback spacing observed in the field should be verified prior to performing the analysis.

2. The global stability calculation for the wall is not an appropriate check to determine the stability of the wall based on an increased tieback spacing. The global stability analysis performed by AMEC illustrates the circular failure plane passing through the steel sheeting. In order for this type of failure to occur, the steel sheetpile section would have to rupture and/or shear in response to the induced loads. This failure mechanism is typically not observed, provided the steel sheeting has been analyzed to resist the earth pressures and moments created by the soil properties and wall geometry. I expect that analysis of the steel sheetpiles was performed during initial wall design and the appropriate sheeting was selected based on required section modulus, steel yield strength, etc. Please provide these calculations for our files or point us to where we can find them in the existing documents.

3. The global stability calculations yielded a factor of safety of 1.208. AMEC noted in their memo that a factor of safety of 1.15 is typically acceptable for structures of this type. It should be noted that industry accepted factors of safety for global stability of wall structures that may impact individual safety are 1.5 for permanent structures. A safety factor of 1.3 is marginally used when there is minimal chance of impact to human safety.

Please let us know if you would like to discuss these. Thanks,

Sharon Fang, P.E.  
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"Davies, Wyn"

Sharon:

09/08/2009 04:17:21 PM

From: "Davies, Wyn" <WDavies@PIRNIE.COM>  
To: Sharon Fang/R3/USEPA/US@EPA  
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Date: 09/08/2009 04:17 PM  
Subject: Metal Bank/Final Tierod Design Memorandum

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Sharon:

Please see the attached technical report from AMEC relative to the "as built" analysis they performed and their conclusion that no modifications to the tie-back system is required to meet the design.

Please forward their report to your technical support team.

Wyn

**Wyn V. Davies, CIH**

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**From:** McKeeever, Kevin J [mailto:kevin.mckeeever@amec.com]

**Sent:** Tuesday, September 08, 2009 3:11 PM

**To:** Vitale, Joseph; Davies, Wyn; Langseder, Steven

**Cc:** Tarsavage, Joseph M; Monahan, Rob; Dotson, Don W; Ramsey, Christopher

**Subject:** Metal Bank/Final Tierod Design Memorandum

Gentlemen,

Attached is AMEC's final design memo for the as constructed tierods related to the sheet pile wall stability. Please contact me with any questions or comments.

Kev

Thanks,

Kevin J. McKeeever, PE, PG

Senior Project Manager

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